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FIRST ALL-UNION SCIENTIFIC AND TECHNICAL SESSION ON MERCURY-ARC RECTIFIERS

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An All-Union Scientific and Technical Session on Mercury-Arc Rectifiers was held in Sverdlovsk from 30 May through 3 June 1949. The session was organized by the Sverdlovsk department of VNITOEO (All-Union Scientific and Technical Society of Power Engineers) and the "Uralelektroapparat" Plant acting on instructions received from the administration of VNITOEO and the Ministry of the Electrical Industry USSR. One hundred forty-eight specialists, summoned from various cities of the Soviet Union, took part in the work of the session.

The proceedings began with a speech by Engineer L. M. Klyachkin, chief of the mercury-arc rectifier division of "Uralelektroapparat" Plant. He remarked that Soviet rectifier building was 25 years old as of 1949.

Twenty-four reports and communications were read, including the following:

Professor I. L. Kaganov, Doctor of Technical Sciences, in his report "VEI (All-Union Electrical Engineering Institute) Research in the Field of Mercury Tubes and Its Analysis," discussed the work in the field of single-anode tubes done by the VEI during the past 10 years. He also pointed out that important investigations on materials used for rectifiers had been carried out, new types of packing had been found for rectifiers without pumps, and great attention had been paid to structural members.

Professor L. A. Sena, Doctor of Physicomathematical Sciences, of NIIPT (Scientific Research Institute of Industrial Transport), in his report "Physical Processes in High-Voltage Mercury-Arc Rectifiers," discussed problems of arc-backs in mercury-arc rectifiers for converting heavy loads and high voltages. The work done provides a correct approach to the problem of designing high-voltage mercury-arc rectifiers for direct-current transmission lines.

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Professor V. L. Granovskiy, of VEI, read a report entitled "Physical Phenomena in a Low-Voltage Mercury-Arc Rectifier." A study was made of arc blow-outs and attendant phenomena. This work enables designers to choose correctly the parameters for individual components of the tubes.

Engineer V. K. Krapivin, chief designer of the mercury-arc rectifier division of the plant, in his report "Typical Designs and Prospects for the Development of High-Amperage Dismountable Mercury-Arc Rectifiers," gave a detailed account of the work of the plant in the field of rectifier construction. The plant has organized series production of single-anode tubes, types RMNV-500X6 and RMNV-500X12, which have the following advantages: a small drop in the arc, a convenient technological process, overload capacity, etc. The rectifiers are produced for voltages up to 3,300 volts and are fitted with control grids for voltage regulation. The report discussed the immediate prospects of further development of heavy-duty dismountable rectifiers. Requirements for planning organizations, scientific research institutes, and operating organizations were formulated.

Engineer Ye. M. Glukh, laboratory chief of the "Urals Elektroapparat" Plant in his report "Some Problems in the Production and Operation of Mercury-Arc Rectifiers" shared his experience in installing and adjusting heavy-duty mercury-arc rectifiers.

T. A. Suyetin, Candidate of Technical Sciences, of VEI, read a report entitled "Cascade Burning of the Arc in Mercury Rectifiers and Methods of Dealing with It." Recommendations based on experiments were made for combating these phenomena.

A. A. Sakovich, Candidate of Technical Sciences, of VEI, in his report "Investigation of Materials for Mercury-Arc Rectifiers," gave an account of the work on investigating anode and packing materials.

E. A. Man'kin, Candidate of Technical Sciences, of MTZ (Moscow Transformer Plant), in his report "Transformers for Heavy-Duty Rectifying Installations of MTZ Design," described the work done by the transformer plant in manufacturing transformers for feeding heavy-duty rectifiers. Special attention was given to the investigation of winding strength. As a result of this work, the plant has achieved considerable success in the manufacture of transformers for high-power rectifier installations.

V. L. Savitskiy, Candidate of Technical Sciences, of VEI, in his report "Type RM-300 Air-Cooled Pumpless Rectifier Designed by VEI," discussed achievements in the field of pumpless rectifiers and their operational tests in the course of 5 months.

Ye. L. Ettinger, Candidate of Technical Sciences, of the "Elektroprivod" Trust, in his report "The Use of Controlled Mercury-Arc Rectifiers for Electric Drives," gave an account of the work done by VEI in this field. One plant built a tube-cascade installation for controlling the speed of an 880-kilowatt induction motor. A second controlled rectifier installation was made for mine-hoisting machinery. Controlled mercury-arc rectifiers have considerable advantages in comparison with Leonard units and commutator cascades.

The report of V. B. Peretts, Candidate of Technical Sciences, "Basic Requirements for Electric Drive Elements with Controlling Mercury Converters," and that of V. A. Shubenko, Candidate of Technical Sciences, of UPI (Ural Polytechnic Institute imeni Kirov), "Industrial Applications of Ionic Drives," treated problems of introducing rectifiers into electric drives.

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V. M. Sin'kov, Candidate of Technical Sciences, of UPI, in his report "Use of Rectifier-Inverter Installations in Power Systems," discussed the work done in this field and described one installation where mercury-arc rectifiers are working under inverter conditions at a voltage of 12 kilovolts and transmit 1,000 kilowatts of power.

Engineer L. M. Pertsovskiy of MPS (Ministry of Railway Communications) read a report entitled "Experience of Operating Mercury-Arc Rectifiers on Electric Railroads and Requirements for New Types of Rectifiers." He discussed the considerable work put in by operational personnel of electrified sections of railroad lines in familiarizing themselves with mercury-arc rectifiers, and sharply criticized the plants of the electrical industry for their slowness in mastering the production of new type rectifiers.

Engineer S. M. Meshcheryakov, deputy chief power engineer of an aluminum plant, read a paper entitled "Experience of Operating Existing Types of Mercury-Arc Rectifiers and Types of Converter Substations for a Large Aluminum Plant."

G. A. Rivkin, Candidate of Technical Sciences, of Tsentroelektromontazh, read a report entitled "Problems of Planning Rectifier Substations and Types of Designs for Single-Anode Rectifiers."

Reports were also read by: V. I. Drozdov, Candidate of Technical Sciences, of NIIP, "Features of High-Voltage Mercury-Arc Rectifiers and Technical Requirements for Them"; M. M. Akodis, Candidate of Technical Sciences, of UPI, "Processes during Arc Quenching in Rectifiers and Requirements for Artificial Testing Systems"; M. A. Chernyshev, Candidate of Technical Sciences, of NIIZHT (Scientific Research Institute of Railway Transport), "The Two-Cathode System of Energy Recovery"; and others.

The session passed a resolution which included the following points: further improvement of the operational properties of dismountable rectifiers, organization of complex planning and delivery of equipment in complete sets, improvement of quick-acting anode circuit breakers, organization of the production of sealed, air-cooled rectifiers, intensification of the study of physical phenomena in rectifiers, and improvement of design procedures.

The resolution included demands on the Ministry of the Electrical Industry regarding delivery of mercury converter units in complete sets with automatization, regulating, and other equipment; and on the Ministries of the Chemical and Metallurgical Industries regarding acceleration of the development and delivery of materials necessary for the production of mercury-arc rectifiers.

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